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Schizophrenia and comorbid sleep disorders

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How to cite this article: van den Noort M, Staudte H, Perriard B, Yeo S, Lim S, Bosch P. Schizophrenia and comorbid sleep disorders. *Neuroimmunol Neuroinflammation* 2016;3:225-7.

Article history: Received: 18-09-2016 Accepted: 20-09-2016 Published: 28-10-2016



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Schizophrenia is a severe psychiatric disorder that has a worldwide prevalence of 0.5%^[1] and poses a high cost to society.^[2] The disorder is characterized by positive symptoms, such as hallucinations and delusions,^[3] negative symptoms, such as impaired emotional functioning and behavioral disruptions (e.g. flat affect, difficulty in starting activities and completing them, etc.),^[4] and cognitive symptoms, such as deficits in executive functioning, impaired working memory, and attention problems.^[5] Less known to the general public is the fact that a large number of the patients with schizophrenia suffer from sleep disturbances, such as reduced sleep efficiency, reduced total sleep time, and increased sleep latency.^[6] Surprisingly, those

sleep problems in patients with schizophrenia are also often under-estimated in daily clinical practice.^[7]

In the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-V),^[8] sleep-wake disorders are classified into 10 disorders or disorder groups (e.g. insomnia disorder, restless legs syndrome, circadian rhythm sleep-wake disorders, etc.). Patients suffering from sleep-wake disorders have problems with respect to the quality, the timing, and the total amount of sleep,^[8] leading to distress and impairment in their social and cognitive functioning.^[9]

Several treatments have been used in patients with



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schizophrenia, as well as patients with sleep-wake disorders. Pharmacological treatment with first- and second-generation antipsychotics (e.g. amisulpride, clozapine, olanzapine, risperidone, *etc.*) is still the most frequently used treatment in patients with first-episode and long-term schizophrenia.^[10] However, mainly because of the adverse effects of the pharmacological treatment, non-pharmacological add-on treatments, such as cognitive behavioral therapy,^[11] are being increasingly used. Sleep-wake disorders are mostly treated with pharmacological interventions, such as benzodiazepines, zolpidem, zaleplon, *etc.*, but unfortunately, side-effects are common here, as well.^[12] In addition, non-pharmacological interventions, such as cognitive psychotherapy, sleep hygiene, relaxation therapy, acupuncture, *etc.*,^[13,14] are used.

Previous research involving patients with schizophrenia and comorbid sleep disorders has shown that a relation exists between sleep problems and cognitive functioning.^[15] For instance, in a recent study, a significant negative relationship was found between the number of sleep problems and the working memory performance; i.e. the more severe the patient's sleep problems was, the lower the patient's working memory performance was.^[15] However, more research is warranted, and to date, many questions remain unanswered: Firstly, how are poor sleep and decreased social and cognitive functioning in patients with schizophrenia related? Secondly, what role does the pharmacological treatment of patients with schizophrenia play in their impaired sleep and social and cognitive functioning? For instance, benzodiazepines are known to suppress rapid-eye-movement (REM) sleep,^[12] and when patients stop such medications, episodes of increased REM sleep are more numerous.^[12] Because REM sleep plays a role in the learning process, as well as in memory consolidation,^[12] future research should clarify whether benzodiazepines might have a negative influence on cognitive functioning, e.g. working memory, in patients with schizophrenia and comorbid sleep disorders. Thirdly, how does the pharmacological treatment of comorbid sleep disorders in patients with schizophrenia interfere with the pharmacological treatment of the positive and the negative symptoms of those patients? These questions need to be investigated and answered in future studies so as to improve further the treatment and the quality of life of patients with schizophrenia and comorbid sleep disorders.

Here, an important finding is that in previous research, patients with schizophrenia tended to underestimate their problems on self-report inventories.^[16] Therefore, in future research, both "objective" (e.g.

electroencephalography, actiwatches, *etc.*) and "subjective" (e.g. self-report inventories, such as the Pittsburgh Sleep Quality Index,^[17] Munich Parasomnia Screening,^[18] *etc.*) measurements must be used if the efficiencies of various pharmacological and non-pharmacological treatments of patients with schizophrenia and comorbid sleep disorders are to be determined with accuracy.

To conclude, many patients with schizophrenia suffer from comorbid sleep-wake disorders. Therefore, in daily clinical practice, sleep needs more attention in the treatment of patients with schizophrenia so that such patients receive optimal treatment and their qualities of life are increased. Finally, evidence for adding "disturbed sleep" as one of the characteristic symptoms of schizophrenia in the DSM system seems to be mounting.^[8,15]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Patient consent

No patient involved.

Ethics approval

This article does not contain any studies with human participants or animals.

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